# Our Children's Eyes

Handbook on Visual Screening
for Nurses and Teachers

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# OUR CHILDREN'S EYES

## Handbook on Visual Screening for Nurses and Teachers

Los Angeles County Superintendent of Schools Office....June 1960
Laco No. 28

# Foreword

**Our Children's Eyes** is designed to serve school nurses, teachers, and administrators as they carry out their individual roles in the school health program. It gives specific information on visual development and on the relationship of the visual mechanism to learning. In addition to the techniques suggested for working with children in visual screening, it includes a description of the design used for the Snellen visual acuity screening test as it has been interpreted by Sir Stewart Duke-Elder, the noted English ophthalmologist. Some general principles for referring children for diagnosis are stated, with some specific suggestions given to facilitate this important step.

From the field of medicine were derived the concepts relating to the history and the observation and measurement of the visual function. From education came records of behaviors and achievements as children learn to read.

The publication is based on the belief that visual screening is a part of the health program just as visual health is a part of general health. It was produced through interest and leadership of Dr. R. Bruce Walter, Chief Deputy Superintendent.

Lloyd E. Webster, Director of the Division of Health, Physical Education and Youth Services, envisioned the usefulness of a handbook such as this. His concern for the visual health of children is based on his many years of work in health education. His support and encouragement made it possible for **Our Children's Eyes** to become a reality.

Marie Wall, Consultant in the Division of Health, Physical Education and Youth Services, assumed responsibility for developing the handbook. She selected the points to be presented and wrote the content. She also selected the photographs and planned the designs to illustrate particular ideas.

Marie B. Dickinson, Consultant in the Division of Elementary Education, edited the work as it developed. Her understanding of children and their ways of learning and her knowledge of the value and the place of health services in general education are reflected in all parts of the publication.

Gerald J. Breakstone, M.D., acted as chairman of the committee within the Los Angeles County Medical Association for the evaluation of the ocular policy for the school system. Appreciation is expressed to Dr. Breakstone and his committee for their deep interest in the development of this publication.

Dr. Gertrude Wood, Coordinator of Research and Guidance, made suggestions which led to the title, **Our Children's Eyes**. Sylvia Yellen, Consultant in the Division of Health, Physical Education and Youth Services, helped by reading and reacting to parts of the manuscript.

George Crow, O.D., O.E.P., read the entire manuscript and made constructive comments on the soundness of the procedures suggested in it.

Dorothy Misbach, Consultant in the Education of the Visually Handicapped, California State Department of Education, also read the rough draft and suggested ways of clarifying points.

C. Morley Sellery, M.D., Director of Health Education, and Dorothy Lyons, M.D., Physician Supervisor, both of the Los Angeles City Schools Staff, also read and reacted to the ideas presented.

Over the years Lloyd Mills, Jr., M.D., has responded generously in group lectures for school nurses interested in visual health. Many of his ideas influenced the content of this handbook.

The many contributions made by Other Speaker, M.D., to visually handicapped children in Los Angeles County are gratefully acknowledged.

Grateful acknowledgment is made to Pasadena City School District for the pictures on pages vi, x, xii, 16, 18, 20, 21, 36, 40. Cooperating with the writer in Pasadena were Paul Kinney, M.D., Chief Physician; Berna Lou Cartwright, Vision Tester; and Lloyd Dilbeck, Audio-Visual Assistant in the Audio-Visual Service.

For photographs on pages xvi, 2, 8, 26, appreciation is extended to Bellflower Unified School District; particularly to Stanton Herbert, Administrative Assistant; Lina Austin, Nurse and Department Head; and Niel Matheson, Audio-Visual Consultant.

The poem on page 30 was contributed by Frances Lewis, School Nurse, East Whittier City School District.

The diagram on page 47 was constructed by Berna Lou Cartwright, School Nurse, Pasadena City School District.

Acknowledgment is made to the following district personnel who were helpful in early planning meetings: Martha Leedy, Curriculum Coordinator, and Ula Roberts and Joyce Warf, School Nurses in Hermosa Beach City School District; Kathryn Sullivan, Nurse Coordinator, East Whittier City School District; Mae Kirtley, Coordinating Nurse, Covina School District; and Phyllis Nichols, Supervising Nurse, Azusa School District.

The work of typing, copying designs, helping plan and assemble the manuscript was patiently and expertly handled by Phyllis DeGroot, Hilda Carey, Janice Gilbert, Paulita Sales, in the Division of Health, Physical Education and Youth Services; by Evelyn Malski, Varitypist in the Division of Research and Guidance; and by Glenn Steiber, Multilith Operator, Division of Elementary Education.

It is unlikely that this list contains the names of all to whom we are indebted. We wish, therefore, to express appreciation to all who feel some identification with the content.

C. C. TRILLINGHAM
County Superintendent of Schools

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# Table of Contents

FOREWORD . . . . . . . . . . . . . . . . . . . . . . . . . . iii

INTRODUCTION . . . . . . . . . . . . . . . . . . . . . . . . . xiii

## SECTION I -- EARLY VISUAL DEVELOPMENT

Visual Development Begins in the Prenatal Period . . . . . . . 1
The Eyes Are Optical Structures . . . . . . . . . . . . . . . . 1
The Visual Pathway Provides a Most Important Avenue of Learning 3
The Eyes of Most Children Are Adequate for Reading . . . . . . 4
Knowledge About Eyes Helps Teachers . . . . . . . . . . . . . . 5
Reversals and Mirror Writing Are Not Related to Vision . . . . 5
    Examples of Reversals in Writing and Drawing . . . . . . . 6

## SECTION II -- EARLY VISUAL EXAMINATIONS AND SCREENING PROGRAMS

Visual Problems Are Found by Preschool Visual Examinations . . 9
Visual Screening Is Conducted Soon After Children Enter School 9
Visual Screening Begins Early in the School Year . . . . . . . 10
Visual Screening May Be Conducted by Teachers . . . . . . . . . 10
Plans for a Visual Screening Program Involve Knowing the Visual Functions and Selecting the Screening Tests to Be Used . . . 10
Visual Acuity Means the Clearness with Which One Sees . . . . . 11
The Snellen Test Is a Test for Visual Acuity . . . . . . . . . 11
A Low Degree of Hyperopia Is the Normal Visual State for Most Young Children . . . . . . . . . . . . . . . . . . . . . . . . 12

Binocular Vision Is Seeing a Single Image with the Two Eyes . . 13
Double Vision Is Not Normal Vision . . . . . . . . . . . . . . 13
Color Vision Results When the Retinal Cells Are Sensitive to Color . . . . . . . . . . . . . . . . . . . . . . . . . 13
Pseudoisochromatic Tests Are Used to Determine a Child's Sensitivity to Color . . . . . . . . . . . . . . . . . . . . 13
Observations Are Continuous . . . . . . . . . . . . . . . . . . 14
Observations May Be More Important Than the Test . . . . . . . 14

## SECTION III -- THE VISUAL SCREENING PROCESS

The Place for Testing and the Equipment for Testing Are Planned . . . . . . . . . . . . . . . . . . . . . . . . . . 17
The Snellen Test Is Done at Eye Level with the Child Seated . . 19
The Right Atmosphere Is Created Before the Test Begins . . . . 19
The Directions Are Given Before the Test Starts . . . . . . . . 22
The Voiced Response of the Child Is a Natural One . . . . . . . 22
Some Exceptions to the Voiced Response Need to Be Considered . 23
A Volunteer Takes the Test First . . . . . . . . . . . . . . . 23
The Right Eye Is Tested First . . . . . . . . . . . . . . . . . 23
The Left Eye Is Tested Second . . . . . . . . . . . . . . . . . 23
The Two Eyes Are Then Tested Together . . . . . . . . . . . . . 23
The Teacher Observes the Child as the Test Proceeds . . . . . . 23
The Record Needs to Be Complete . . . . . . . . . . . . . . . . 24
Suggested Form for Use as Visual Screening Record . . . . . . . 24

## SECTION IV -- CONCERNS RELATED TO EYE HEALTH

Eye Safety . . . . . . . . . . . . . . . . . . . . . . . . . . 25
Tinted Lenses Are Related to General Safety . . . . . . . . . . 27
Television Is Part of the Education Program . . . . . . . . . . 27
"You're Not Like All the Others" . . . . . . . . . . . . . 30

## SECTION V -- REFERRALS

Suggested Standards for Referring Children Guide School Personnel . . . . . . . . . . . . . . . . . . . . . . . . . 31
    The National Society for the Prevention of Blindness . . . 31
    The Health Committee of the American Medical Association and the National Education Association . . . . . . . . . 32
    The California State Department of Education . . . . . . . 32
    The Los Angeles County Medical Association . . . . . . . . 32
Suggestions Concerning Referrals Help Improve Screening Programs . . . . . . . . . . . . . . . . . . . . . . . . . 33
Suggested Referral Form . . . . . . . . . . . . . . . . . . . 34
Helps to Get Corrections Are Important to Children . . . . . . 35

## SECTION VI -- SPECIAL EDUCATION FOR THE VISUALLY HANDICAPPED CHILDREN

The Visually Handicapped Group Includes Blind and Partially-Sighted Children . . . . . . . . . . . . . . . . . . . . . 37
Kinds of Provisions for Visually Handicapped Children . . . . 38
Teachers Add to Their Knowledge of the Visually Handicapped Children . . . . . . . . . . . . . . . . . . . . . . . . . 38
Resource Teachers Function in a Variety of Ways . . . . . . . 38
Modern Philosophy and Research Change the Lives of the Visually Handicapped Children . . . . . . . . . . . . . . . . . 39

CONCLUSION . . . . . . . . . . . . . . . . . . . . . . . . . . 41

## APPENDIX

Vocabulary of Terms Relating to the Eye . . . . . . . . . . . 43
Explanation of Snellen Symbol . . . . . . . . . . . . . . . . 45
Graphic Representation of the Snellen Symbol . . . . . . . . . 46
Diagram of Snellen Symbol . . . . . . . . . . . . . . . . . . 47
Diagram of Eye . . . . . . . . . . . . . . . . . . . . . . . . 48
Bibliography . . . . . . . . . . . . . . . . . . . . . . . . . 49

# "Look"

"To look is to learn," they say, and we all agree that is true. But in our concern for that wild, unknown being, the child, who is both bottomless pit and impregnable fortress, we are apt to accuse him of not looking often enough or carefully enough. We show him things that he seems not to see, and we nag at him without noticing that he is busy taking in -- how? by hearing, feeling, the pores of his skin, or an ephemeral sixth sense? -- some marvel that he keeps to himself.

"Look! Look quickly!"

"I *am* looking," he says, with a rather bewildered air, and we lower our voice to complain to one of our fellows, meaning of course another grown-up: "It's odd, but there are times when that child is unaccountably stupid."

"Look at that splendid horse going by! You won't see splendid horses like that much longer, my poppet!"

He looked and saw, close to the ear of the gaily decorated horse, a red artificial carnation, three little varnished green leaves which surrounded it, the rib running down the middle of each leaf, the serrated edge of the petals, two little stalks rolled in the form of a crozier to imitate the stamens of the flower. He did not see the horse.[1]

---

[1] Sidonie Gabrielle Claudine Colette, *Creatures Great and Small* (New York: Farrar, Straus & Cudahy, 1951), pp. 207-208. Reprinted with permission of the publisher.

EYES
S. SUTTON-VANE

# Introduction

Long ago, in Massachusetts, a wise layman penned an idea that has become one of education's classics: "Every child should be taught, early in life, that to preserve his own life and his own health and the lives and health of others is one of his most important and constantly abiding duties."[1] Lemuel Shattuck, in a few words, thus voiced a hope for the general health of young America.

Eye health is a part of general health. Children can learn and practice health measures early in life. In families, parents are constantly explaining why certain foods are necessary, why rest is needed. Every day there are occasions when children, even infants, get information on safety measures for their own and others' protection.

Education for health continues through life. Most five-year-old children, in the kindergarten are ready and eager to learn. In school many opportunities occur for children to examine and evaluate everyday activities related to health. They may talk about the balance between quiet and active work periods or the need for rest and nutrition periods. These discussions contribute to the understanding of growing children concerning their own health. Growth in appreciation and understanding of the value of this balance helps them to assume a personal responsibility as they participate in each part of the school day. A child soon learns how much more he can accomplish and enjoy when he feels well.

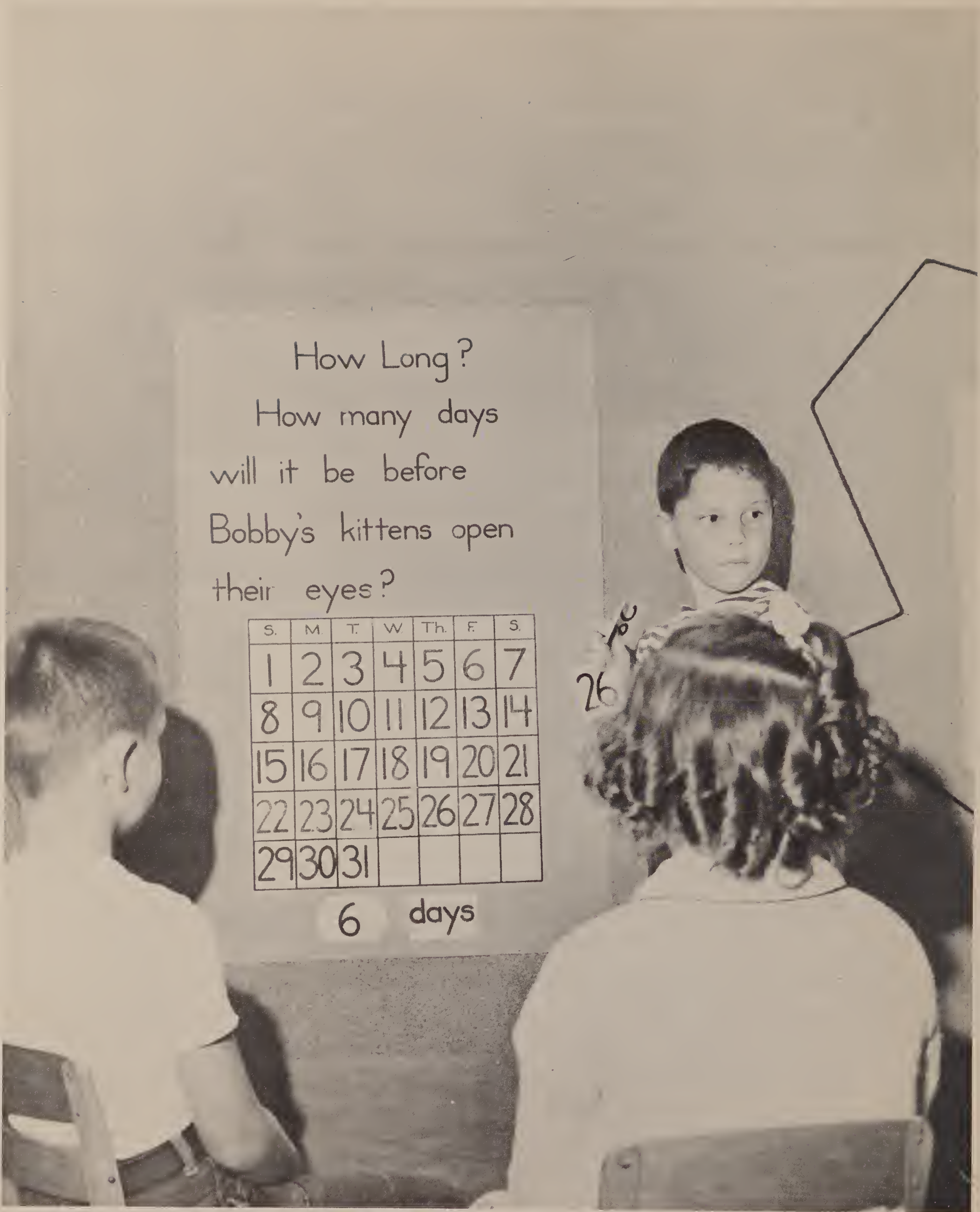
---

[1] *Report of the Sanitary Commission of Massachusetts* (Boston: Dutton and Wentworth, 1850), p. 178.

Resources for the study of visual health and comfort are also at hand. In every classroom the children use their eyes in a wide variety of circumstances. The conditioned environment, readily adaptable to visual needs, provides the ideal laboratory for children's experiment and study. Continuous observation by the teacher of how children feel and react and the use of the Snellen Test, an efficient evaluation instrument, are among the health services the school provides.

The relationship of light to seeing shows one way man is dependent upon his environment. Man can see because there is light. In schoolhouse planning this principle is taken into consideration. As school populations increase and new facilities are needed, studies of lighting influence decisions concerning construction. A sufficient amount of well-diffused light is made available. Color plays a strong part in a comfortable environment. A fine balance is sought between light and color. Within this kind of a classroom, seating and work places are arranged to take full advantage of aids to visual comfort. Artificial light is readily available to supplement the natural light of the sun as it is needed on cloudy days or as the sun moves away in its daily journey. The use of a light meter as an instrument for measuring lighting conditions and discussions of these conditions help children build understandings that influence their whole life experience. Children learn much from using the light meter in their own classrooms.

Visual screening offers another important approach to education for health. It can justly be called an experience-centered study. Children have an active curiosity to learn more about themselves. In preparing a group for experiencing the Snellen Test, a useful screening procedure, the teacher may introduce children through a little study and discussion of information about the way the eye works, and the principles upon which the Snellen Test is constructed. As children understand more about the testing process, they eagerly look forward to discovering some indications of their own visual acuity.



How Long?

How many days will it be before Bobby's kittens open their eyes?

| S. | M. | T. | W. | Th. | F. | S. |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 |  |  |  |  |

6 days

# Section I

## EARLY VISUAL DEVELOPMENT

**Visual Development Begins in the Prenatal Period.** The developing eye cells can be seen in the early weeks of foetal life.[1] It takes a few months after birth for the further growth of retinal nerve endings and for the muscles to gain strength. Development continues through adolescence.

Every day the infant's visual acuity increases, and the two eyes continue stabilizing in their task of working together. A steady visual alignment is present in most children at the age of one year.[2] Light sense or light perception is strong from birth. Later color and form sense develop. At six months of age most infants have considerable awareness of objects and faces. Visual development has a vital influence on the emerging personality.

During these months, before an infant can walk, talk, or feed himself, he can see quite well.

**The Eyes Are Optical Structures.** Heredity determines the color and size of the eyes, and some other conditions affecting the visual

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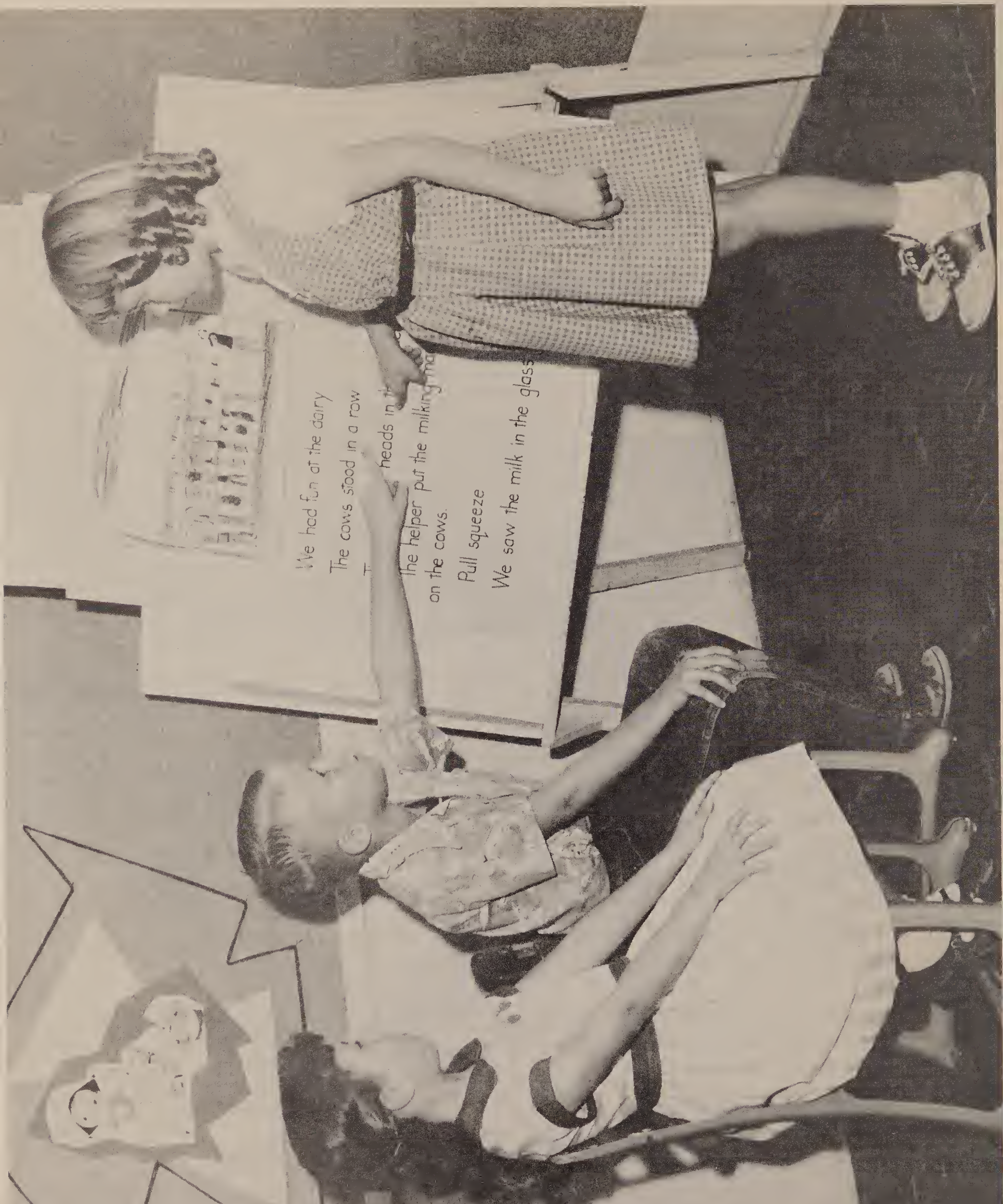
[1] Henry Gray, F.R.S., *Anatomy of the Human Body*, 27th Edition, Charles Mayo Goss, M.D., ed. (Philadelphia: Lea & Febiger, 1959), p. 1098.

[2] Richard G. Scobee, *A Child's Eyes* (St. Louis: C. V. Mosby Co., 1949), chap. 3, p. 28.


We had fun at the dairy
The cows stood in a row
heads in
The helper put the milking
on the cows.
Pull squeeze
We saw the milk in the glass

tract. The functions of accommodation, convergence, and pupillary reaction are governed by the involuntary nervous system. The visual system is efficient enough to carry images to the brain.

> The average human eye is not an optically perfect structure in a mathematical or physical sense, but it is a physiologically effective and durable organ with a wide range of adaptability.[3]

Each part of the anatomy of the eye is arranged to help receive, modify, and pass on the light images. Through its elasticity the lens changes shape to give a clear view of distant and near objects. To look at near objects the two eyes converge, and the lens accommodates by changing shape. By this means the focus is kept sharp on the retina. To look at a distant object the lens relaxes, the eyes become parallel. Simultaneously the pupil plays its role in making seeing clear and comfortable. It reduces in size to exclude some light and expands to let in more.

Without any conscious effort each part of the eye is used to serve its purpose.

**The Visual Pathway Provides a Most Important Avenue of Learning.** The visual images are interpreted as they reach the occipital lobe of the brain. It is there that seeing is actually accomplished. From their mothers' arms infants constantly watch and imitate those around them. They are learning to accept or to resist what they see early in life. Interest and curiosity are strong motivating forces for learning.

A two-year-old child is frequently observed picking up a thread or other minute object and examining it as he sits on the floor. As he sights an object, reaches for it, grasps it, looks at it, he is developing his skills. He may devote several minutes to this inspection or longer if his interest continues. He is able to do this because he can see.[4]

During the first five years children grow rapidly. They are infinitely busy gathering first-hand information. They can be observed, in almost any of their activities and experiences, adding to their visual impressions by listening, tasting, touching, handling. Each experience adds a little more to their understanding. Thousands of such repetitions build up the child's ability to understand the visible and the unseen world. With lightning speed visual images travel the visual pathway to the perceptual areas in the brain.

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[3] Los Angeles County Medical Association, *Ocular Policy for Public Schools* (Los Angeles: The Association, 1940, rev. 1959), mimeo.

[4] Richard G. Scobee, *A Child's Eyes* (St. Louis: C. V. Mosby Co., 1949), chap. 3, pp. 28-30.

Memory of past impressions and their associations with them enhances or changes each visual concept of a seeing child.

**The Eyes of Most Children Are Adequate for Reading.** A young child of school age, free from defects of the visual mechanism, can see symbols easily and clearly. Even though his eyes can do this, his interest and general growth characteristics demand a slow approach to the printed page. He needs time and many experiences to develop the ideas, concepts, and oral language that he must have to interpret experience when it is expressed in the form of printed symbols. Pictures, his own paintings, and watching the teacher write the ideas he dictates are among the visual stepping stones to reading.[5]

Learning to read does not tax the visual equipment of a child. The experience, intelligence, and general development of a child are important in learning to read. A few children at five years of age may be ready to learn to read in all phases of their growth. These are an exceptional few. Growth and development usually proceed unevenly in their mental, physical, emotional, and social aspects. For this reason about one-third of the children who enter first grade at the age of six are ready to read with success and enjoyment. About one-third are ready by the age of seven. Some children, about one-third, are not ready for the demands of reading until they are eight years old.

Reading "readiness" is a term which describes a child's general maturity or fitness for the task of learning to read. In visual terms, "readiness" describes his ability to make projective use of what he has been learning from infancy. A five-year-old can paint pictures to organize his thoughts. He learns to write his initials or name. He asks the teacher to write for him so he can express his meanings in a different form. He learns to recognize some printed words and numbers. He can talk about most of his activities. As he works and plays, he wants and asks for new words to understand and describe what he is doing.

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[5] See Los Angeles County Superintendent of Schools, *Guiding Growth in Reading* (Los Angeles 12: County Board of Education, 1952), for a description of the developmental process of learning to read.

A child of five or six knows much more than he can project. He receives many visual images about which he has incomplete concepts. His eyes are ready to receive and pass on much which appears in his environment, but he cannot yet express all that he has assimilated and understands.

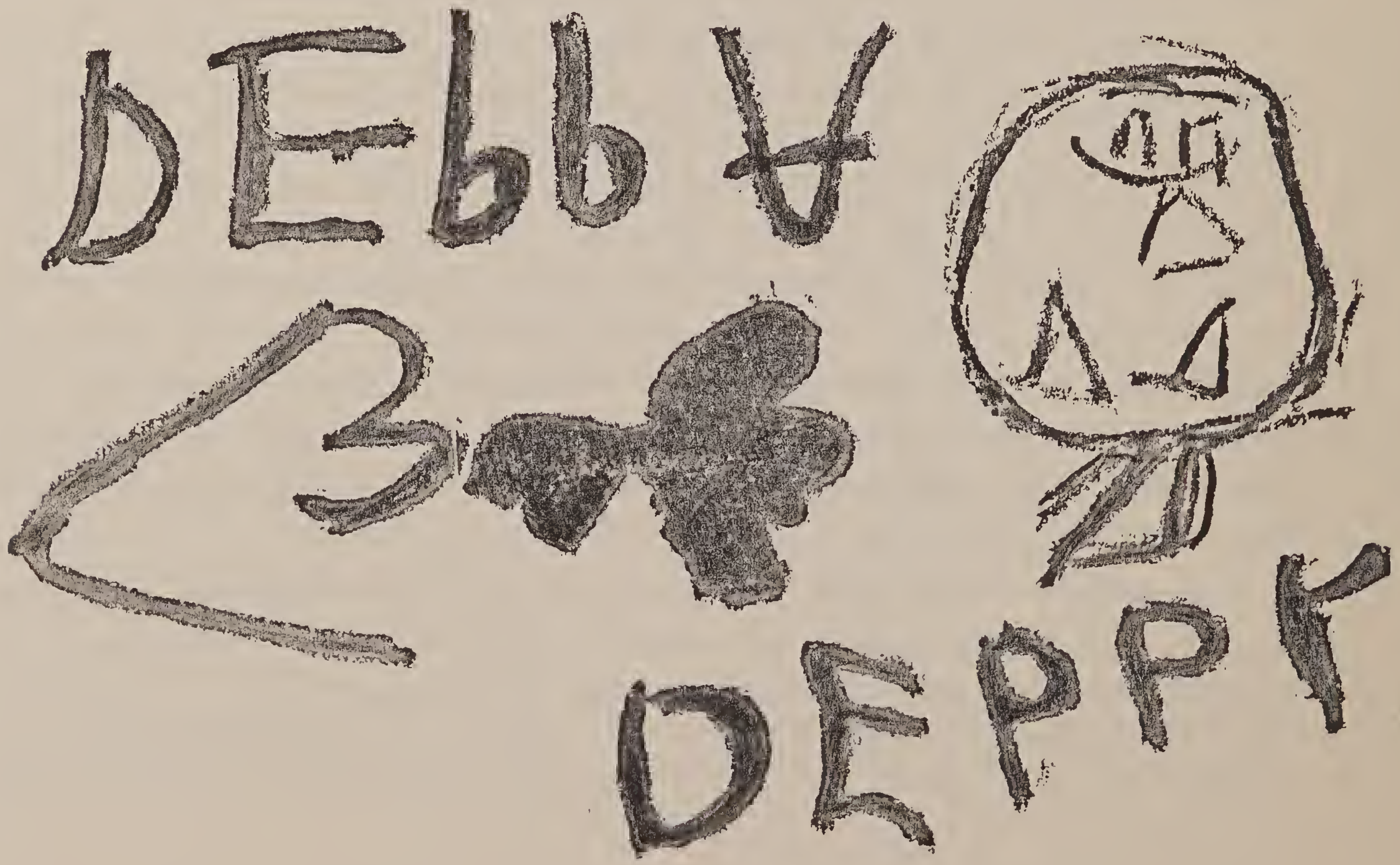
Classrooms are set as a stage for learning. The teacher and children cooperate in deepening the meanings in everyday experiences. Interests may center in discoveries on a walk, in a new pet, or in a new brother or sister. Each child learns at his own pace. As a teacher watches and guides the day's work class activities become an adventure in new discoveries, learnings, and satisfactions.

When children grow and learn in such an encouraging environment, gathering information by using all their senses, they achieve a certain mental and physical sturdiness. They develop confidence in their ability to perceive new relationships. Learning to read printed symbols gradually assumes an important place in learning activities.

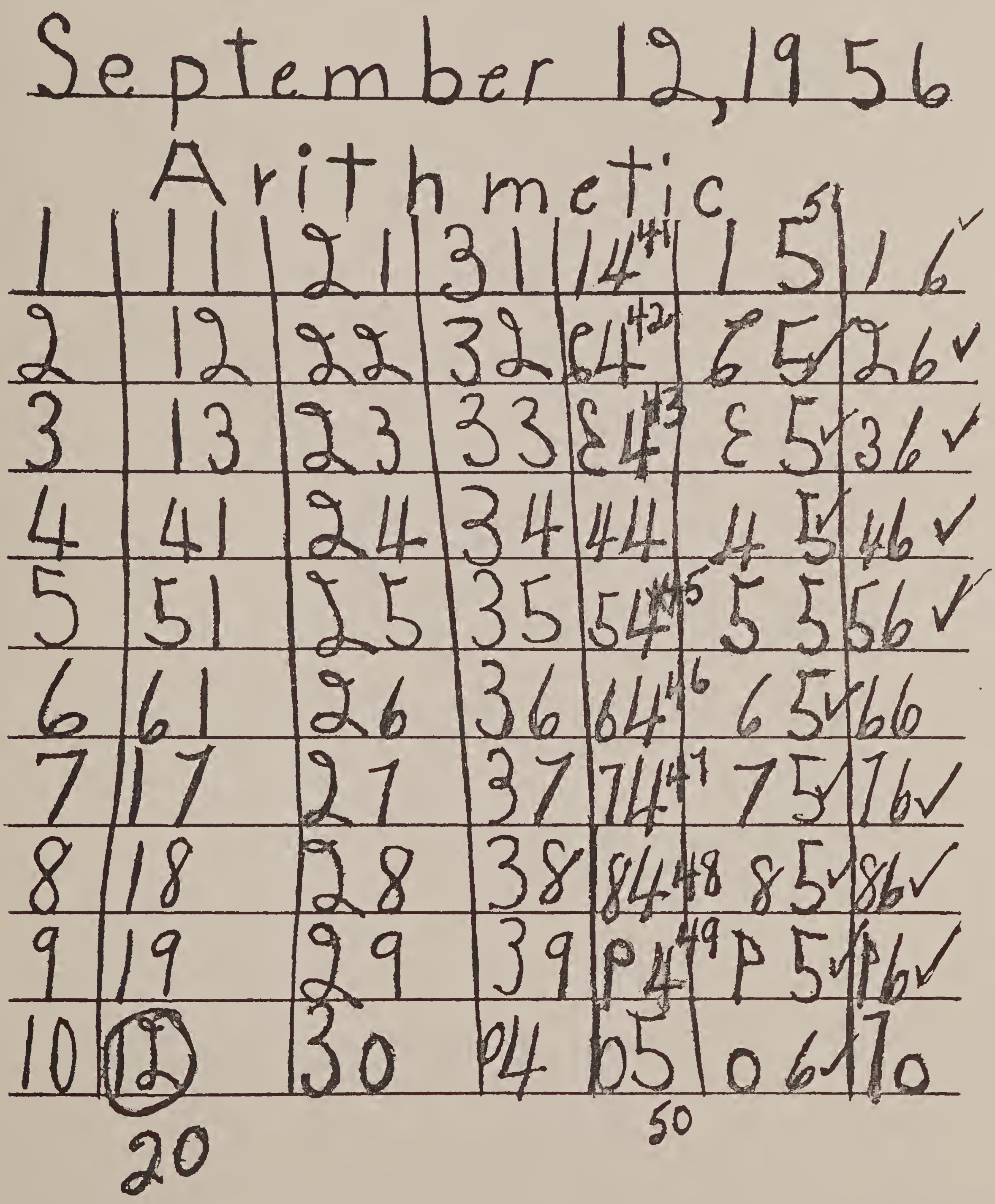
**Knowledge About Eyes Helps Teachers.** Teachers understand and are continually evaluating children's reactions to their experiences. A child may say, "I am tired," or "My eyes are tired." The teacher knows eyes do not tire with the average day's tasks. The muscular control is involuntary. Like the heart and stomach muscles, eyes do not tire unless some defect is present. The teacher needs knowledge to decide whether such a child is actually expressing boredom or frustration with his work or whether he needs an eye examination. Children quickly show and express frustration when their work is beyond their interest and experience. In reading and study, they sometimes associate their frustration with their eyes.

**Reversals and Mirror Writing Are Not Related to Vision.** Children may see and write letters and numbers in odd positions when they begin the complex activities of reading and writing too early. Pressure for accomplishment increases the problem. The teacher accepts verbal responses until a child can gradually gain experience and coordination enough to succeed in arranging letters and words in meaningful ways. The importance of symbol arrangement is not apparent to children until they have experiences in observing others write and in discussing writing as the teacher records. Knowledge of this part of the learning process helps teachers to avoid undue pressures and to delay teaching the mechanics of writing and reading to insure children's later success and feelings of adequacy.

Debby took six months to control letters and pictures. She wrote her name with some letters upside down when she entered kindergarten. At Halloween she made pumpkins standing on their heads. When her teacher helped her discover this, Debby wanted to copy one in an upright position. When Valentine's Day came, Debby had turned her hearts halfway around. Her teacher, the nurse, and her mother watched with interest as Debby made this progress. No one exerted pressure on her. Her success in perceiving symbolic relationships depended on time and the understanding of the adults around her. They observed with understanding the process Debby was growing through. When she gets into the first grade she will continue to acquire maturity and experience which will be reflected in the way she perceives and manages writing and reading.



This example of an arithmetic paper of a nine-year-old repays study. What does this tell us about perception, fatigue, interest, and purpose? Do we need to look at the child as well as the paper? What is the problem? Do the teacher's marks on the paper really help the child with the problem?



September 12, 1956

Arithmetic

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 11 | 21 | 31 | 14$^{41}$ | 15$^{51}$ | 16✓ |
| 2 | 12 | 22 | 32 | 64$^{42}$ | 65✓ | 26✓ |
| 3 | 13 | 23 | 33 | E4$^{43}$ | E5✓ | 36✓ |
| 4 | 41 | 24 | 34 | 44 | 45✓ | 46✓ |
| 5 | 51 | 25 | 35 | 54$^{45}$ | 55 | 56✓ |
| 6 | 61 | 26 | 36 | 64$^{46}$ | 65✓ | 66 |
| 7 | 17 | 27 | 37 | 74$^{47}$ | 75✓ | 76✓ |
| 8 | 18 | 28 | 38 | 84$^{48}$ | 85✓ | 86✓ |
| 9 | 19 | 29 | 39 | P4$^{49}$ | P5✓ | P6✓ |
| 10 | ⑫ | 30 | P4 | 05 | 06✓ | 70 |
| | 20 | | | 50 | | |

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Julie
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Janice
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David
Raymond
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Book Reports
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# Section II

## EARLY VISUAL EXAMINATIONS AND SCREENING PROGRAMS

**Visual Problems Are Found by Preschool Visual Examinations.** Some visual problems found among young children are myopia, hyperopia, and astigmatism. Occasionally disease processes and strabismus are found. Such problems make preschool visual evaluations essential to the welfare of children. Disease processes and strabismus discovered early can benefit from treatment.

Increasingly, reports of preschool visual examinations accompany children to school when they enter the kindergarten. Such reports give teachers more understanding and confidence in their work with the very young children.

**Visual Screening Is Conducted Soon After Children Enter School.** Visual problems are common among school children and the presence of most of the difficulties can be identified by screening tests conducted at school.

> The story of the child whose poor vision is first discovered late in his school life is frequently told -- "Until I got these glasses, I didn't know there were separate leaves on trees."

Visual screening programs in schools are motivated by an increasing interest in the health of children. Healthy children represent a great potential of strength in the nation. School personnel look for every opportunity to improve health in the interest of learning.

Visual screening programs also meet legal requirements regarding children's health.

**Visual Screening Begins Early in the School Year.** When screening is done at school in September and October, more time is allowed for referral and follow-up measures. Corrections where necessary may be made, and the questions teachers and parents have can be answered.

Results of visual screening tests help teachers in their observation of the children during the following months. Teachers are in a position to answer the children's questions about their eyes as they occur.

**Visual Screening May Be Conducted by Teachers.** The National Society for the Prevention of Blindness and the American Medical Association support the philosophy that teachers may screen vision.

The California State Department of Education adopted this philosophy in 1953 and furnished legislation in support of it. The position is explicitly stated in the *California Administrative Code, Title 5. Education* in Chapter I, Subchapter I, Article 7.5, "Eye Screening Tests for Pupils."

A few school districts in California are carrying out this provision. Some of the most effective programs are those in which the nurse and teacher work together in close cooperation.

In Southern California, school nurses do most of the visual screening programs at the present time. There is strong support for this service to be performed by school nurses.

**Plans for a Visual Screening Program Involve Knowing the Visual Functions and Selecting the Screening Tests to Be Used.** Recognition of known visual functions precedes planning for a visual screening program. Physiologists and anatomists have identified five visual functions:

Visual Acuity
Accommodation
Binocular Vision
Color Vision
Peripheral Vision

Two of the visual functions are considered for school screening. They lend themselves to school screening programs. They are coming into focus as the possible and productive screening tests for school children.

Visual Acuity
Color Vision

**Visual Acuity Means the Clearness with Which One Sees.** Visual acuity is an acknowledged major function of the eyes. Disease processes, some eye injuries, myopia, an appreciable amount of hyperopia, astigmatism, and sometimes strabismus affect visual acuity. Interference with visual acuity probably accounts for most of the twenty-five per cent of those believed to have a visual problem.

Visual acuity is measured by the Snellen Test. The results are recorded as the line read. The record of the result is expressed as 20/20, 20/30, 20/50, 20/70, on through 20/200. The report of 20/20 indicates the person tested can read at 20 feet the symbol measured to be read at that distance. The report of 20/70 indicates the person tested can read at 20 feet the symbol measured to be read at 70 feet. A reading of 20/15 is exceptionally clear visual acuity. A reading of 20/20 represents average visual acuity. Millions of test measurements have established 20/20 vision as a household expression. A report of 20/70 represents less than average visual acuity.

**The Snellen Test Is a Test for Visual Acuity.** This instrument is a simple test scientifically designed. Its simplicity, one of its assets, may give the impression that it is not effective. Doctor Snellen's research combined several disciplines: physiology, physics, and mathematics. The visual angles of one and five minutes used in his design supports its soundness.[1]

Keen analytical minds have studied Snellen's design for over a hundred years. No other method of testing has been found to be more effective. The test stands as a great classic in physiological research. Wherever eyes are tested in the world, the Snellen measurements are used. When the test is used with insight and care, those who have a problem with visual acuity that needs to be referred for further study will be found.

The Snellen measurements appear in several forms on test charts. Symbols, letters, and numbers are forms frequently used. They are designed on a visual angle of one minute.

The test chart suggested for use in schools, described in this guide, is the symbol chart. It consists of a series of measured symbols printed in black on white cardboard.

Because of the Snellen Test's small demand on the other physical of mental resources of a child, it may be used with very young children. The test is conducted in ordinary light, at a distance of twenty feet. At this distance the lens of the eye is relaxed, at rest. It takes one minute to administer the test. The person being tested has only to indicate the direction of the arms of the symbols as they are pointed out.

Violations of the standard procedures for administering the test invalidates the results.

**A Low Degree of Hyperopia Is the Normal Visual State for Most Young Children.** Young children have large amounts of accommodation available to them for close work. For most children this power of accommodation tends to cancel the effect of minor amounts of hyperopia.

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[1] See the explanation of the Snellen Design in the Appendix in this handbook, pp. 45-47.

Educators have observed that young children accomplish more when their tasks of close application are delayed or of short duration. Most adults realize that physiologically young children need changes of activity and pace more frequently than more mature children.

**Binocular Vision Is Seeing a Single Image with the Two Eyes.** Binocular vision occurs when the two eyes are well coordinated, each held in its place by six muscles, and there is strong perceptual control. A single image enters each eye and falls in an upside-down position on the retina. The nerve endings in the retina are stimulated by the light, and the images are carried to the perceptual area for seeing in the occipital lobe of the brain. The two images are fused in an upright position and the person is said to have fusion or single, simultaneous, binocular vision.

This action happens instantaneously. The person who looks at an object is completely unaware of the two images or of their having been in an upside-down position on the retina.

**Double Vision Is Not Normal Vision.** Double vision may appear as a symptom of certain conditions, diseases, and injuries. When a school child has such a complaint he should have immediate consideration. Other clinical signs and history may be present. An example is when a child voluntarily keeps one eye closed.

**Color Vision Results When the Retinal Cells Are Sensitive to Color.** Color blindness occurs when retinal nerve cells, called cones, do not respond to color. Color blindness has a small incidence in the population. Males have this condition more than females. It has been found that probably less than five per cent of the male population is color blind. Knowledge of color blindness is important as a vocational aspect of the child's life.

**Pseudoisochromatic Tests Are Used to Determine a Child's Sensitivity to Color.** These tests are being used in some school testing programs. A detailed guide accompanies the set of plates which compose the test.

The instructions for giving the test will not be repeated in this guide.

**Observations Are Continuous.** Observations of children for visual problems are a part of the screening program. Observations are carried on all through the school year. Visual problems may develop at any time in a child's life. Parents, teachers, and nurses are in a strategic position to make observations.

Through many years of experience, certain kinds of visual behavior, including changes in the physical appearance of the eyes and a child's reaction when using his eyes, have come into focus as considerations for referral.

Such indications as squinting, holding books too close, rubbing the eyes, the presence of red lids, styes, or crossed eyes, are conspicuous as symptoms.

In a testing situation a child's statement about his eyes, if unsolicited, is believed to be dependable. Children want to please adults, therefore direct questions are avoided. If a question is used, it may take this form: "Do you want to say anything about your eyes?" Children recall the big events in their lives pretty well. Operations, accidents, the use of glasses are subjects they are quite able to describe. They usually let the teacher know if they think letters blur, or report to her if they have a headache.

**Observations May Be More Important Than the Test.** The result of intelligent observations may be more definitive of need for referral than the results of the screening tests. There is general acceptance of the need for immediate referral of children who show physical evidence of visual problems. A child's statement, indicating a visual problem, is recognized as an immediate concern also. Test results are subjective reactions. Their value makes them a necessary part of the screening program.

# Section III

## THE VISUAL SCREENING PROCESS

**The Place for Testing and the Equipment for Testing Are Planned.** The place to be used, twenty feet long and several feet wide, is generally available in a classroom and in the nurse's room. The testing can be done in either place. Each place has some advantages.

Screening in the classroom allows the teacher and nurse to work together. The process becomes a part of the learning in the classroom. Time is saved.

When screening is done in the nurse's room a little more privacy is insured. The nurse's room may be less crowded than some classrooms. It has the weight of tradition behind it. Four children usually go to the nurse's room at one time. Children feel comfortable in a new experience when several of them are together.

A Snellen chart is protected from bending and damage by pinning if mounted on stiff, white poster board. Color contrast is also avoided. The chart is a convenient, inexpensive instrument for testing. A lighted case containing a Snellen chart is used in many schools. The case stands on a table or hangs from the wall at eye level.

A tape measure is used to measure the exact distance. A light meter measures the twenty-foot candles of light needed. The light should be well diffused. A straight, armless chair is used for the child. Its height should allow him to put his feet comfortably on the floor.

"Window cards" are used as pointers. Two thin, white pasteboard cards, 12" long and 6" wide, each with a round window near the center are used. One window is 2¾" in diameter, the other 1" in diameter. These windows may be adjusted to size needed. The child has more visual comfort, while being tested, if only one symbol at a time is exposed. The window card makes this possible. The window card also makes it easier to be exact in pointing out the symbols to which a child is to respond. A pencil or pointer seems not to direct attention for the child as well as does the window card. The window card is held flush against the test chart, to avoid any shadow being cast on the symbol.

Cover cards or occluders are used for covering one eye while the other is tested. One kind frequently used is a white 3 x 5 filing card, cut with a handle. The handle makes it possible for a child to hold the cover correctly over the eye without any help. Thus the person administering the test does not need a helper.

A paper cup is another type of occluder. It is a most effective one for young children. They can hold it over the eye without touching the lashes. Since both eyes should remain open, pressure is avoided by the use of the cup.

A clean cover card or cup is used for each child.

A wastebasket is placed near the child for convenience in discarding his cover card.

One large Snellen symbol, mounted on cardboard, is used to demonstrate the different positions the symbol takes on the chart.

**The Snellen Test Is Done at Eye Level with the Child Seated.** Adjustments can be made for the chart to be at eye level for the five-year-old, the twelve-year-old, and the seventeen-year-old child, when he is seated. The chalk tray at the base of the chalk board, in modern classrooms, is at the right height for the age group in that classroom. The chalk tray serves to hold the mounted chart, if the tests are done in the classroom. Suitable arrangements can be made for an eye-level position for the chart, if the testing is done in the nurse's room.

**The Right Atmosphere Is Created Before the Test Begins.** The children are interested in special projects. Visual screening is one in which they are actively and personally involved. They like to know what is planned for them. They like to discuss and enter into the

plans. Participation lends support to each child. Psychologically he feels this is something "I can do."

The children look with interest at the equipment and listen attentively to the directions. Visual screening does not happen every day. An eager desire to go through the test is stimulated by the way in which the nurse and teacher talk and act.

**The Directions Are Given Before the Test Starts.** The chart and other equipment are shown to the children.

The way the window card is used, on the chart to expose one symbol at a time, is demonstrated for the children. The symbol exposed is the one to which a response is expected.

The use of the cover card, to occlude the eye not being tested, is demonstrated also. The child learns that the right eye is tested first, while the left eye is covered. Then the left eye is tested, while the right is covered. Next both eyes are tested together. The two eyes act as a team, therefore it is necessary to know how they perform together.

The separate, demonstration symbol is used as they are told how to respond. The teacher demonstrates how the arms of the symbol point in various directions as the card is turned so that the arms point down, up, or to the side. The children are asked to call out informally, down, up, side, or the other side as the teacher turns the symbol. Some of the children may use other words, "toward the ceiling," "toward the sky," "toward the roof" for up, and "toward the ground," "toward the floor" for down. Their answers are accepted as long as they can be interpreted.

Right and left, as responses to the direction of the symbol are not dependable for young children. Every effort is made to eliminate barriers to a quick response.

The objective of the test is to learn how the child sees, not to find out what he knows.

**The Voiced Response of the Child Is a Natural One.** Speech is a convenient method of communicating. Children are being encouraged to speak in other activities in school. A voiced response eliminates the need for checking the child's gesture each time to see how he is signalling. Older children in junior and senior high school much prefer a voiced response. They reject the gestured response as something "for babies."

**Some Exceptions to the Voiced Response Need to Be Considered.** The hand signal is found helpful with children who do not use their speech freely. Deaf children, children who stutter, cerebral palsied, and mentally retarded children usually feel more comfortable using a hand to signal.

The way of responding which is best suited to each child is used.

**A Volunteer Takes the Test First.** Generally a child who feels secure and confident responds to a request for a volunteer to be first. His action gives confidence to others who are ready when he finishes. The test is given in a quick, practical way. The child is seated, comfortably, twenty feet from the chart, holding a cover over his left eye.

**The Right Eye Is Tested First.** The one who is testing starts at the top of the chart, at 20/200, and moves quickly but deliberately down through the lines of symbols. As each symbol is exposed the child gives his response, as he looks at the chart with his right eye.

In the upper lines, it is only necessary to point out one symbol on each line, using symbols of different directions until the 20/20 line or the 20/30 line is reached, whichever line is the passing line for this particular child. In either of these lines three or four symbols are pointed out. If a child reads these symbols quickly and accurately, his ability to see is obvious.

**The Left Eye Is Tested Second.** The child is asked to move the cover over to his right eye. As he removes the cover from his left eye, it is watched for any shift in its position. An appreciable shift in the position can sometimes be observed while the Snellen Screening Test is in process. The left eye is tested. When the cover is removed, this eye is also watched for any shift in position.

**The Two Eyes Are Then Tested Together.** If the child has passed the test with each eye, it is not necessary to start at the top again for the two eyes. The 20/20 line or the 20/30 line will suffice.

**The Teacher Observes the Child as the Test Proceeds.** As the child starts responding, his voice may be quick, sure, and his reading accurate. When the child encounters a little difficulty, it shows in his voice. The symbols may be blurring for him, and his response slows and sounds like a question. He may start leaning forward a little, trying to see better. He may frown, for the same reason. Tears may appear, and the eyes may show pink. Some children may suddenly stop to say, "I can't see it." Some will make an effort by guessing a little. This is to be expected and is not mentioned.

Those who are considered passing will finish on the expected line with the same tone, in which they started, quick and accurate. The child who makes this kind of a response, appears relaxed throughout the test. He sits comfortably on his chair, and he shows he feels secure, sees well and easily. Other children make an obvious effort from the beginning, and they show it in their behavior.

**The Record Needs to Be Complete.** Records contain a full report of the tests given to each child. The results of each child's test are recorded immediately after the tests are completed. Space is provided for any observations made of the child during the screening period. The record provides a reference for sending a notice to the child's parents. Information from the screening record appears on the cumulative folder for each child.

**Suggested Form for Use as Visual Screening Record Appears Below.**

Date____________________

School____________________ Grade____ Teacher____________________

TEST ALL CHILDREN WEARING GLASSES WITH AND WITHOUT THEM

| Name of Pupil | Grade | Age | R | L | Both | Observed Eye Coordination | Remarks |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
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# Section IV

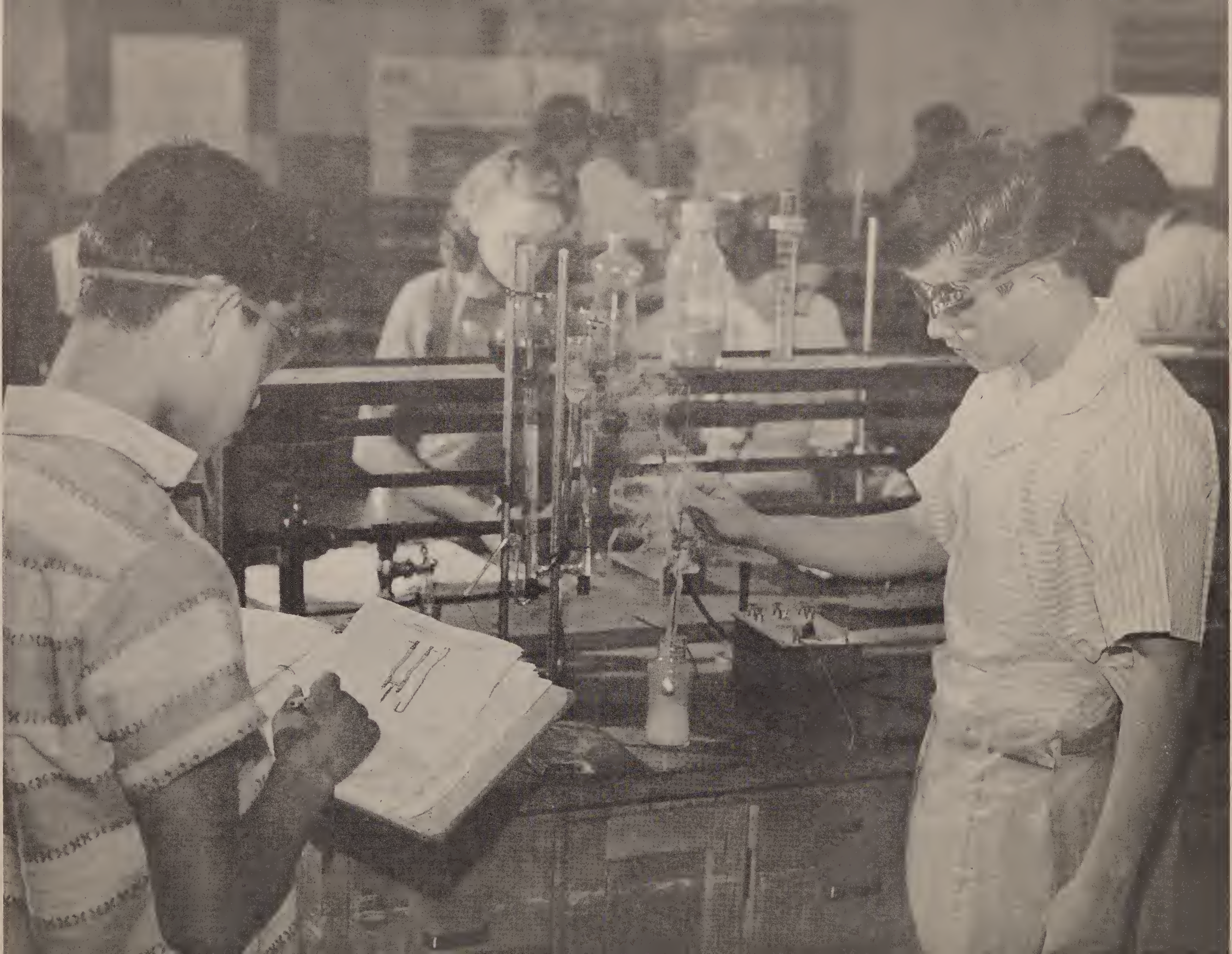
## CONCERNS RELATED TO EYE HEALTH

**Eye Safety.** Many children lose their vision through accidents. Information from the National Society for the Prevention of Blindness reveals that about 10,000 eyes are lost each year by children in accidents with specific toys, such as BB guns, darts, and slingshots, and with other sharp objects. These accidents usually happen during unsupervised play activities. Very few severe eye accidents happen at school where children have supervision and where such toys are out of bounds. Firecrackers, once a great hazard, now cause fewer accidents because they are outlawed.

Many states are presently enacting legislation outlawing the use of BB guns and darts, and governing their use in supervised activities. The legal restrictions usually also impose an age limit.

In school situations where chemicals are in use or where shop activities are going on, specific precautions are necessary. Protective goggles prevent serious accidents.

The effective first-aid measure for any chemical in the eye is profuse flushing the eye under running water, followed immediately by a proper referral. Foreign bodies are never removed from the cornea by one doing first aid.



The cornea, covering the colored part of the eye, is a thin, clear tissue easily damaged. It is never treated except by a specialist. The ordinary, unattached foreign bodies, those frequently seen in the conjunctival sac, may be flushed out with clear water. A magnifying glass is a part of every well-equipped first-aid station. Without magnification foreign bodies may escape notice.

In any school activity where a blow to the eye or head is sustained, which in any way suggests injury, a report is sent to the child's parents. The adverse results of such an accident may not show up for several hours or days. Sufficient observation following an incident of this kind protects children.

The school administrator takes responsibility for the provision of acceptable written first-aid instructions for all school personnel.

**Tinted Lenses Are Related to General Safety.** Tinted lenses reduce the amount of light entering the eye. When such lenses are worn after dark, seeing is more difficult. When they are worn for driving after dark, they create a serious hazard for the driver, other drivers, and pedestrians.

There are occasions when tinted lenses may make participation in some activities more comfortable. For days on the water or on the beach they relieve the effects of strong glare.

The kind and amount of tint and the situations where tinted lenses may be worn safely are questions of vital importance. Individuals who feel the need for this kind of protection need professional advice.

**Television Is Part of the Education Program.** Young children are visually comfortable sitting fairly close to the television screen because they have a large amount of accommodation. Their developmental pattern demands, for them, a close look. A small child wants to be near the person to whom he talks, and to his toys. The younger the child the closer he wants to be in communication with whatever he is doing or observing.

When children of different ages watch television together a kind of self-demand process prevails. The older children sit farther back in the room even though no one has directed them to do so.

The amount of light in the room may have more importance as far as fatigue is concerned. Enough light to prevent a great contrast between the screen and the rest of the room prevents visual discomfort.

The person who develops undue visual fatigue while watching television may have a visual defect. Healthy, normally functioning eyes are not generally subject to difficulties in the visual activities of life. In school television programs children are observed for signs of visual discomfort.

Form B. This form may be used for reporting visual defects.[1]

____________________________ School District

## REPORT OF HEALTH APPRAISAL -- VISION

__________________ School Date _______________

Dear Parent:

As part of the school program your child's vision is screened periodically and your child is observed for indications of possible visual problems. Recently your child, ________________________,
*Name of Pupil*
has shown signs suggestive of: _______________________________

________________________________________________________

________________________________________________________

While this is only an impression and not a definite diagnosis we believe that your child will be helped if this condition receives professional attention as soon as possible.

Please sign and detach the note below and return it to the school so that we may know that you have received our letter.

Yours very truly,

____________________, Principal

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

To the Principal:

I have received the health appraisal report of __________________.

Date _________________ ____________________________
*Parent's Signature*

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[1] Form approved, in compliance with Chap. 885, Statutes 1957, by the Superintendent of Public Instruction, State of California, September, 1957.

## YOU'RE NOT LIKE ALL THE OTHERS

'Bout that we all agree.
You bully all the mothers,
especially poor me.

Many years we've gone the rounds
about my daughter's vision,
but finally you wore me down
I bowed to your decision.

I took her to a specialist,
Doc Fusco was the name,
he gave her tests on her blue eyes
his verdict was the same.

One eye is set a little up,
above the other eye.
And so she has to tip her head
in order straight to spy.

He said that glasses won't be good
in her case, not at all.
She must be looked at twice a year,
I take her in the fall.

So if when next she goes, her eyes
in vision don't work
he'll operate upon them,
and that I will not shirk.

And so Nurse Lewis now you know
You can let up on me.
And out of all the other Ma's
get someone else to see.

Sincerely,

A Laurel School Parent

(This is a poem sent in to Frances Lewis, nurse from Laurel School, East Whittier City School District.)

# Section V

## REFERRALS

**Suggested Standards for Referring Children Guide School Personnel.** Standards for referral have evolved after years of observations and through tests by professional people who evaluate visual disabilities. Experience shows that about twenty-five per cent of school children have a need for a visual examination. Referrals originate from screen tests, observations, the child's own statement, and from emergency conditions of accident and illness.

The referral standards have been influenced by the age and growth characteristics of children.

Several professional organizations have suggested referral standards.

The National Society for the Prevention of Blindness recommends:

> Referring children for eye care who have visual acuity of 20/30 or less (who cannot pass the 20-foot line after rescreening), we feel that the referral standard is best decided for a particular community or county by the local eye specialists, school health personnel, and school administrators. In many schools throughout the country it seems that children are referred for visual acuity of 20/40 or less (who miss the 20/30 line after screening).[1]

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[1] National Society for the Prevention of Blindness, in personal correspondence with the Office of the Los Angeles County Superintendent of Schools, September 15, 1959.

The Health Committee of the American Medical Association and the National Education Association makes a suggestion:

(a) Those who consistently exhibit symptoms of visual disturbance, regardless of the results of the Snellen Test,

(b) older children who have a visual acuity of 20/30 or less in either eye, with or without symptoms, and

(c) younger children (seven years of age or less) who on a re-examination have a visual acuity of 20/40 or less in either eye, with or without symptoms.[2]

The California State Department of Education, Visual Screening Subcommittee on School Health, makes this suggestion:

> Pupils 12 years of age or under with 20/40 vision or less in one or both eyes that has been verified by a retest given by the school nurse or other designated person should be recommended for referral to a health adviser for examination.
>
> Pupils over 12 years of age who miss more than one symbol on the "30" line with one or both eyes as verified by a retest should be recommended for referral to a health adviser for examination.
>
> Pupils with unequal vision between the two eyes, such as 20/20 in one and 20/40 in the other, verified by a retest, should be recommended for referral to a health adviser for examination.

The Los Angeles County Medical Association makes a practical suggestion for referring children:

> Younger children, kindergarten-third, who do not achieve 20/30
>
> Older children, fourth grade and above, who do not achieve 20/20
>
> Children who have symptoms and complaints.[3]

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[2] Joint Committee of the National Education Association and the American Medical Association, *School Health Services, A Report of the Health Problems in Education* (Washington: National Education Association, 1953), p. 77.

[3] Los Angeles County Medical Association, in personal correspondence with the Office of the Los Angeles County Superintendent of Schools, October, 1959.

**Suggestions Concerning Referrals Help Improve Screening Programs.** Careful visual screening, rescreening, and a written referral are essential. Visual screening which follows recommended practices is apt to be quite dependable. However, rescreening may reduce the number of overreferrals. The reason for overreferrals should be understood and appreciated by both parents and professional eye personnel. It is believed the school screening program could not be exact enough to select only those who need care.

A written referral, which states the problem, signed by the person who did the test and the school principal, is directed to the parents.

Reports of so-called normal results to screening tests are not sent to parents. A screening test is not conclusive of normalcy and does not in any case give assurance to a parent for the future of his child's visual condition.

**Suggested Referral Form Appears Below.**

Date ______________________

School ______________________

Dear ______________:

Recent observations of ______________________ at school lead us to believe that there is apparently need for further examination of ______________________. Observations are ______________________ ____________________________________.

______________________, Principal

______________________, School Nurse

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

Note to the Examiner:

We are referring this child to you because of the above findings. The school will appreciate a report from you and any recommendations you desire to make. This information will be of help in planning the educational program for this child.

## REPORT OF EXAMINER TO THE SCHOOL

(Tear off and return to school)

To the Principal or School Nurse of ________________________ School:

Examination of ________________________________ reveals
*Name of Child*

Comments: ____________________________________________

Recommendations: ______________________________________

______________________, Examiner

______________________, Title

Date of Examination ________________

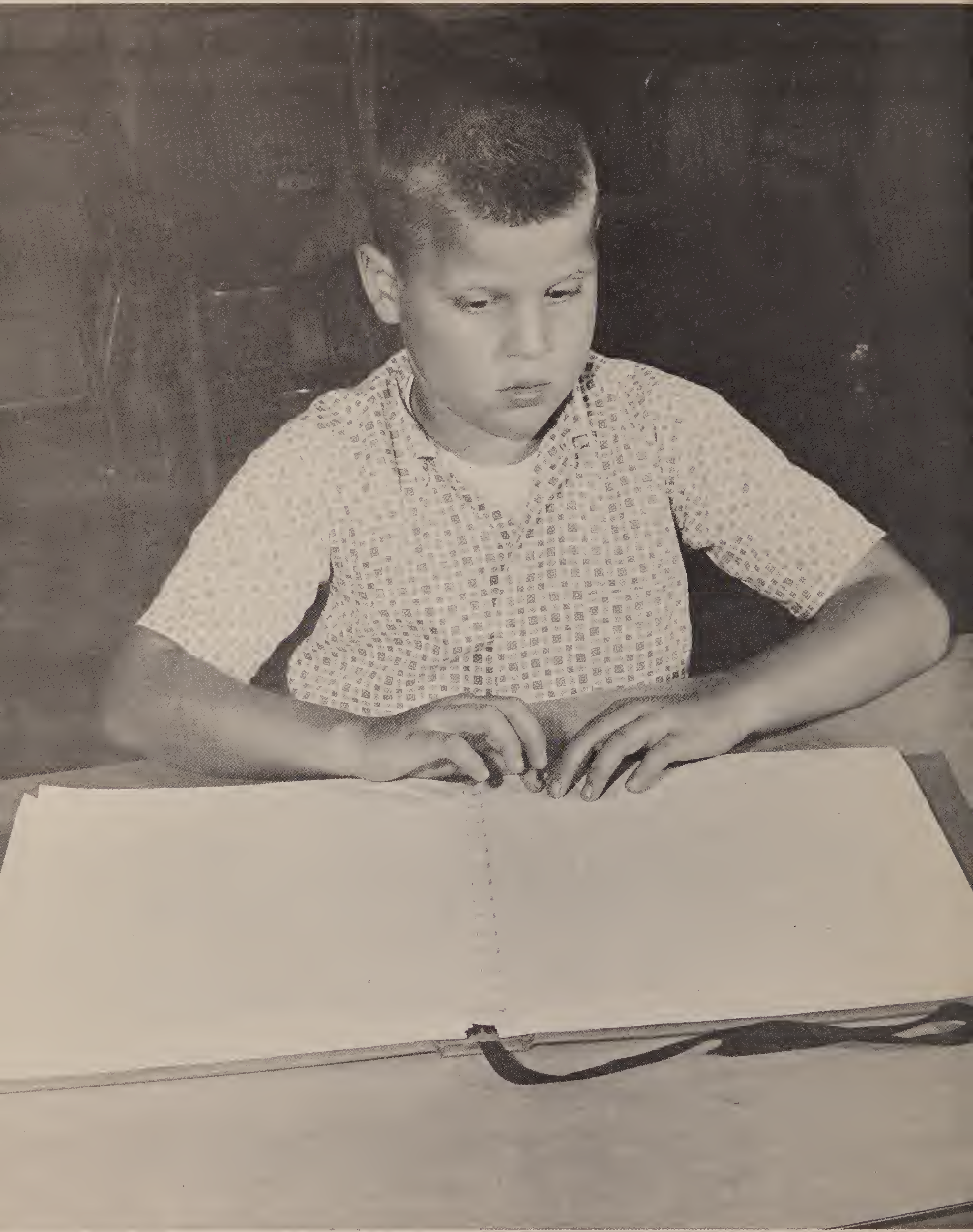
Recommendations which may be made by the examiners regarding individual children are appreciated by school personnel. The teacher is in a position to help carry out the recommendations which involve seating and the care and wearing of lenses.

**Helps to Get Corrections Are Important to Children.** The child's need for definitive evaluation is the basic reason for referral. Most children are taken by their parents to their own family health adviser.

Family financial problems need to be considered. Parent-Teacher groups and other local clubs frequently make funds available for a child's care. One national service club has stated, "No child in the United States need go without visual care, examination, and correction because he cannot afford care."

Private and public clinics are available. Children who have economic problems, as well as long-term visual problems, such as strabismus or ptosis of the eyelid, may receive care through the Program for Physically Handicapped Children.

Whatever the situation, school personnel seek ways to meet the child's requirements.



# Section VI

## SPECIAL EDUCATION FOR THE VISUALLY HANDICAPPED CHILDREN

**The Visually Handicapped Group Includes Blind and Partially-Sighted Children.** The group includes children whose visual acuity has either been eliminated or reduced substantially by disease or injury, children whose visual fields are substantially reduced, and other children on special recommendation. A broad screening program helps select those who may be in need of medical care and special education.

The exact, measured amounts of visual acuity are only a part of the information used to determine a child's ability to use materials in the classroom. A visual acuity of 20/200 is now known not to be a barrier to reading large print for many children who are considered blind.

Both blind and partially-sighted children need the freedom to select materials which they can use comfortably. A child may be handicapped by any one or more than one difficulty, such as speech and hearing problems, mental handicap, orthopaedic difficulties. A gifted child may have a visual or other handicapping problem.

Reports of physical and mental tests, the children's own judgment of the amount of braille and print they can use, along with the teacher's observations, are all important in planning special educational experiences.

**Kinds of Provisions for Visually Handicapped Children.**

Residential School for the Blind
California State Department of Education

Large city day classes for partially-sighted and blind children

Cooperating districts provide classes for partially-sighted and blind children with resource teachers

Children placed in regular classes may receive help from traveling, resource teachers for blind and partially sighted in some cities and counties

Supplemental services are available through education counselors, California State Department of Education

**Teachers Add to Their Knowledge of the Visually Handicapped Children.** There are many avenues through which teachers in any of these situations explore and add to their own concepts of how to work more effectively with visually handicapped children. Individuals offer their help and suggestions as consultants in national, state, and county organizations. There are many sources of help in periodicals and books devoted to this subject.

**Resource Teachers Function in a Variety of Ways.** The resource teachers are those who have special preparation in helping children with severe visual problems. They have developed skills with these children in the use of equipment and materials used by them. Resource teachers counsel with the children, their parents, and other school personnel. Their help lends support to children as they enter and adjust to the school environment.

Because resource teachers have paved the way, many classroom teachers have developed real skills in working with visually handicapped children. They are making possible the children's first need, a natural, comfortable place in the life of the school. The children enjoy working, playing, and learning with children of their own age who can see. They take part in physical education activities and go on study trips with enthusiasm and confidence. Growing up in an environment where new experiences are met gradually, they are not likely to develop dependencies, unattractive physical mannerisms, or fears.

**Modern Philosophy and Research Change the Lives of the Visually Handicapped Children.** Children who have visual handicaps are growing up in a world where sociological changes are rapid. New educational practices, preventive and rehabilitative health measures represent a force of advance in the interest of human life.

Children may use the visual mechanism for reading small or large print, or use the quick touch of sensitive fingers to gather information. The way in which they work, in the world of ideas, is changed very little. Whatever the tools or the method, children of all ages and countries bring to the raw material they work with, the gift of their own inherent abilities, their imaginations, and their powers of learning from past experiences.

The child without sight knows that snowflakes are cool and soft, and that they melt to water, pack into a snowball, can be built into a house or snowman.

# Conclusion

Sixty years ago health personnel were employed in education as the need for their contribution became apparent.

The Snellen Screening Test was among the first health services to be offered in schools. Many who used the test chart thought the letters and symbols were employed without any specific understanding of the measurements. Dr. Snellen's research was little known.

Visual screening started at the fourth grade. It was generally accepted that children's eyes were developed and could be tested at the age of ten. The symbol test chart, commonly used today, serves children as young as the preschool years.

As education developed and expanded in the United States more children attended school for longer periods. The public directed its attention to the public schools. Great strides were being made in child health. As a broad health program developed, visual screening increased.

As larger numbers of children were being educated, reading, as a problem for some, became evident. School personnel wondered about the eyes. Not much was known then about how children learn. It followed naturally to attach failure in learning to the eyes. The next step was to blame the visual screening test since many children passed the test who still did not learn. Many kinds of tests were suggested by various groups of interested persons.

Mechanical instruments were offered for use in schools which contain batteries of visual screening tests. They all include Snellen targets whose measurements have generally been modified. Such instruments claim to test at near point what should be done at distance. This is not physiologically possible. The cluster of tests usually include tests for visual acuity, color blindness, strabismus, and near point tests. Some also include depth-perception and reaction time tests.

Complex test equipment acts as a barrier between the person giving the test and the child. The human relationship is lost.

Opinion is yielding to research. More insight has been gained about how children learn. Less emphasis is placed on the eyes. As studies of visual screening continue, the value of the Snellen Test is recognized.

Visual screening programs which meet the needs of children and can be accomplished quickly and inexpensively are the most rewarding ones. In such programs, each child is given an adequate Snellen Screening Test every year. Intelligent observations of the children's eyes are made continuously. Parent education is carried on to increase complete preschool health examinations. Examinations which include visual evaluations are conducted. Adequate referrals are made which include follow-up procedures.

School personnel are seeking more opportunities to prepare themselves in all aspects of the visual screening program.

# Appendix

## VOCABULARY OF TERMS RELATING TO THE EYE[1]

| | |
|---|---|
| **ACCOMMODATION** | The increase of the refractive power of the crystalline lens for vision at varying distances. |
| **ASTIGMATISM** | Refractive error in which light rays are not brought to a single focus because of a difference in the degree of refraction in the different meridians of the eye. |
| **CENTRAL VISUAL ACUITY** | Faculty of the eye to perceive the shape or form of objects in the direct line of vision. |
| **CONES** | Together with rods are receptors for optic nerve. Together they are light-perceiving layer of retina. Cones concentrated at macula are concerned with sharp vision and perception of shape. |
| **CONJUNCTIVA** | Mucous membrane which lines the eyelids and covers the eyeball except over the cornea. |
| **CORNEA** | Clear, transparent (watch crystal) portion of the external coat of eyeball forming front of aqueous chamber. |
| **DIOPTER** | Unit of measurement of strength of refractive power of lenses. |

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[1] National Society for the Prevention of Blindness, *Publication No. 172* (New York: The Society), 1959.

| | |
|---|---|
| **FIELD OF VISION** | The entire area which can be seen without shifting the gaze. |
| **FOCUS** | Point to which rays are converged after passing through a lens. Focal distance: distance rays travel after refraction before focus is reached. |
| **FOOT-CANDLE** | Unit of measurement of light intensity. One foot-candle = amount of light cast by a standard candle one foot on an area one foot from the light. |
| **FUSION** | The coordination by the brain into one image of the separate images formed on the retinae of the two eyes. |
| **GLARE** | A bright spot within the field of vision. |
| **LENS** | A refractive medium of which one or both surfaces are curved. |
| | **Crystalline lens** -- A transparent, colorless body suspended in the anterior portion of the eyeball between the aqueous and the vitreous chambers, the function of which is to bring the rays of light to a focus. |
| | **Corrective lenses.** |
| **LIGHT PERCEPTION** | L.P. -- Ability to distinguish light from dark. |
| **MACULA** | Yellow spot. The small area of the retina which surrounds the fovea. With the fovea it is the area of distinct vision. |
| **REFRACTIVE MEDIA** | The media of the eye having refractive power; includes cornea, aqueous, lens, and vitreous. |
| **RETINA** | Innermost coat and perceptive structure of the eye formed by the expansion of the optic nerve and covering the back part of the eye. |
| **STRABISMUS** | Squint. Failure of the two eyes to direct their gaze at the same object; muscle imbalance. |
| **VISUAL ACUITY** | See **Central Visual Acuity**. |

## EXPLANATION OF SNELLEN SYMBOL

"It is generally accepted that the foveal cones are the end organs of vision in the central area of the retina. It follows that if two luminous points are to be distinguished separately two cones must be stimulated while an intermediate one remains unstimulated, so that the smallest resolvable image must have a diameter just greater than that of a macular cone. Anatomical measurements show that this distance on the retina is about 0.002 mm. Consequently from Figure 750 . . . . the minimal visual angle optically possible is about 24 seconds. Persons with very good vision are certainly able to see separate images subtended by this angle in optimum optical conditions, but for most practicable purposes the limit is taken as a visual angle of 1 minute."[1]

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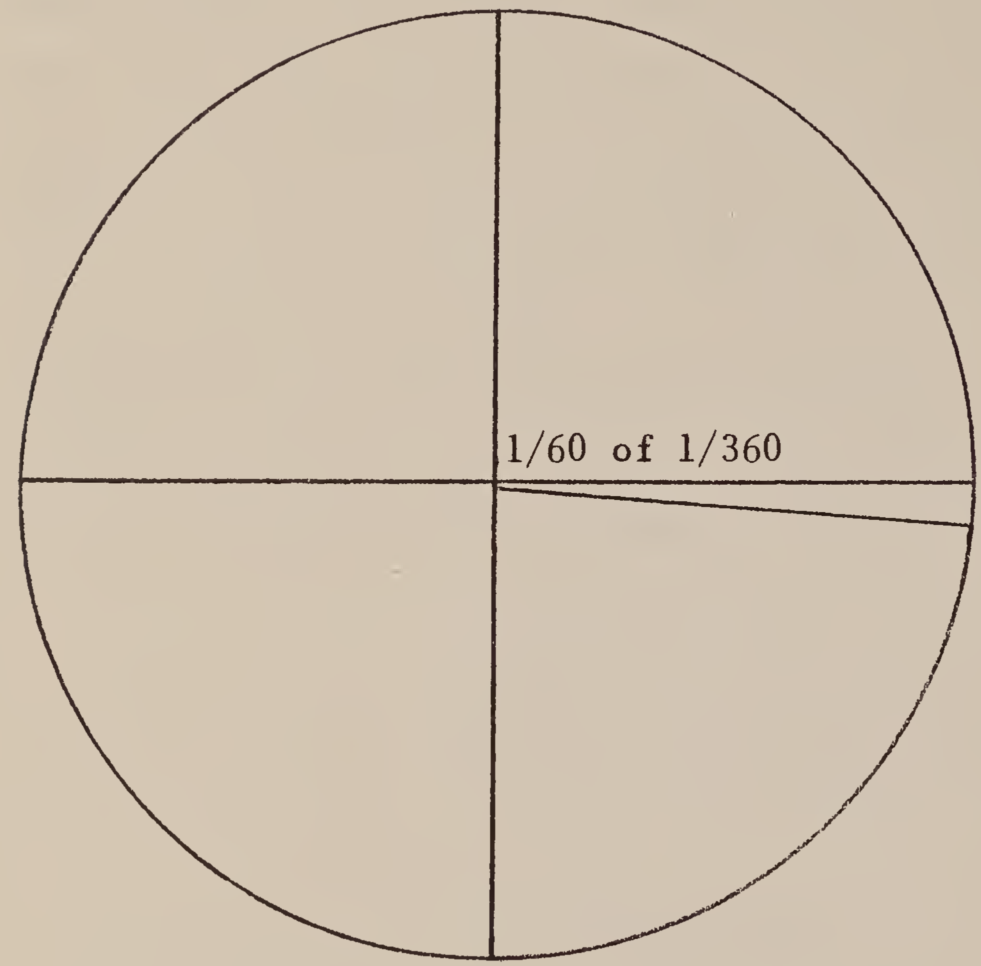
[1] Sir W. Stewart Duke-Elder, "The Development, Form and Function of the Visual Apparatus," in *Textbook of Ophthalmology*, Vol. I (St. Louis: C. V. Mosby Co., 1937), chap. 17, p. 741.

## GRAPHIC REPRESENTATION OF THE SNELLEN SYMBOL

360° = Arbitrary work circle measurement



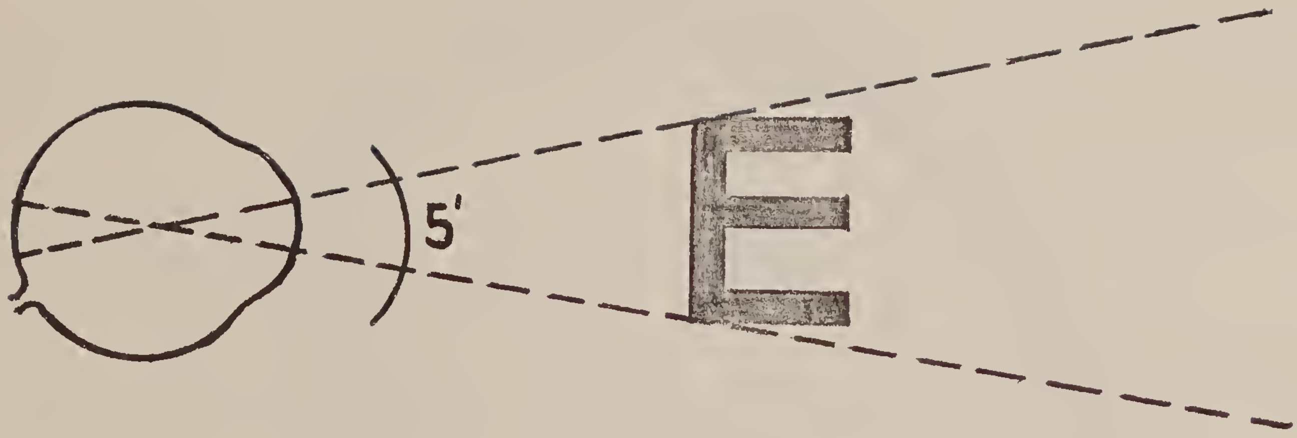
1/360 = 1°

1° = 60 minutes - An arbitrary fact

1/360 = 60 minutes

1/60 of 1/360 = 1 minute or visual angle of 1 minute

Each element of the Snellen symbol E equals a visual angle of one minute. For comparison purposes in the test, five one-minute elements are arranged in the form as it appears on charts in everyday use.



B.L.C.

DIAGRAM OF SNELLEN SYMBOL

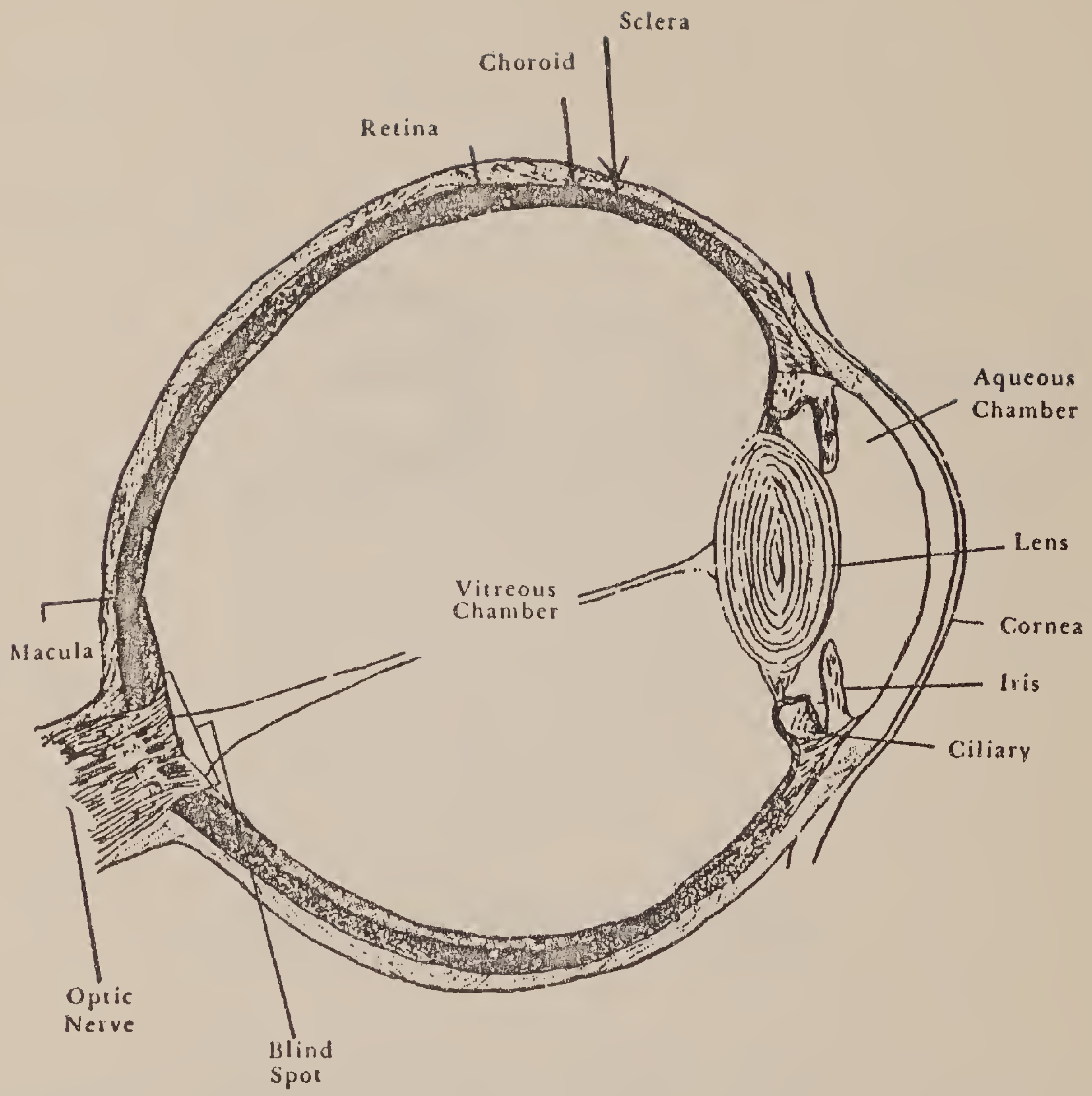


DIAGRAM OF EYE

## BIBLIOGRAPHY

### BOOKS

Adler, Francis Heed, M.D. *Gifford's Textbook of Ophthalmology*. Philadelphia: W. B. Saunders Co., 1957.

Bjarnhof, Earl. *The Stars Grow Pale*. Translated from the Danish by Naomi Walford. New York: Alfred A. Knopf, 1958.

Cruickshank, Wm., Ph.D., and Orville G. Johnson, Ed.D. *Education of Exceptional Children and Youth*. Englewood Cliffs, N.J.: Prentice-Hall, 1958.

Cutsforth, Thomas Darl. *The Blind in School and Society*. 15 West 16th Street, New York 11: American Foundation for the Blind, 1931; rev. 1951. (Ink Print Edition)

Duke-Elder, Sir W. Stewart. "The Development, Form and Function of the Visual Apparatus," in *Textbook of Ophthalmology*, Vol. I. St. Louis: C. V. Mosby Co., 1937. Chap. 17, p. 741.

Galisdorfer, Lorraine. *Educational Reading Guide for the Partially Seeing*. Buffalo, N.Y.: Foster & Stewart Publishing Co., 1951-1959. Annotated.

Gesell, Arnold, M.D., and Catherine S. Amatruda, M.D. *Developmental Diagnosis*. New York: Paul B. Hoeber, Harper & Brothers Medical Book Department, 1947.

Hathaway, Winifred. *Education and Health of the Partially Seeing Child*. New York: Columbia University Press, published for National Society for Prevention of Blindness, 1959. 4th ed.

Henderson, Florence G. *Structure and Function of the Eye*. 1910 Ocean Avenue, San Francisco: The Gutenberg Press, 1957.

Kronfeld, Peter C., M.D. *The Human Eye in Anatomical Transparencies*. Rochester, N.Y.: Bausch & Lomb Press, 1943.

Los Angeles County Superintendent of Schools Office, Division of Elementary Education. *An Analysis of Some Claims Made for Controlled Reading Instruments*. Los Angeles 12: County Board of Education, 1959.

Los Angeles County Superintendent of Schools Office, Division of Elementary Education. *Guiding Growth in Reading.* Los Angeles 12: County Board of Education, 1952.

————. *Three Critical Papers on the Use of Mechanical Instruments as Aids in Reading Instruction.* Los Angeles 12: County Board of Education, 1959.

Los Angeles County Superintendent of Schools Office, Division of Research and Guidance. *Guiding Today's Children.* A Guidance Book for Teachers and Administrators of Elementary Schools. Los Angeles 12: County Board of Education, 1959.

May, Charles H., M.D. *Manual of Diseases of the Eye.* Baltimore: William Wood & Co., 1939.

Pelone Anthony J. *Helping the Visually Handicapped Child in a Regular Class.* TC Series in Special Education. New York: Teachers College, Columbia University, 1957.

Scobee, Richard, M.D. *A Child's Eyes.* St. Louis: C. V. Mosby Co., 1949.

Sutton-Vane, Sybil. *Story of Eyes.* New York: The Viking Press, 1958.

## PAMPHLETS

*A Career with a Challenge.* Vocational Rehabilitation Counseling of Blind Persons. Maxine Wood, ed. Published by the American Foundation for the Blind, 15 West 16th Street, New York 11, N.Y., 1959.

*A New Selected Bibliography of Literature on the Partially Seeing.* Compiled by Lorraine Galisdorfer, Teacher of Partially Seeing Children, Kenmore Public Schools, Kenmore, N.Y., 1951.

*Health Appraisal of School Children.* Report of the Joint Committee on Health Problems in Education. American Medical Association and National Education Association. American Medical Association, 535 North Dearborn Street, Chicago 10, Ill.; National Education Association, Washington, D.C., 1957. 2nd ed.

*Laws and Regulations Relating to Education and Health Services for Exceptional Children in California.* California State Department of Education, Sacramento, Calif., 1960.

*Vision Screening of School Children.* A Guide for Vision Screening of School Children in the Public Schools of California. Recommendations of California State Department of Public Health and California State Department of Education, Sacramento, Calif., 1953.

## PERIODICALS

*Journal of Exceptional Children*, National Education Association, 1201 Sixteenth Street, N.W., Washington 6, D.C. Issued monthly, October - May.

*New Outlook for the Blind*, American Foundation for the Blind, 15 West 16th Street, New York 11, N.Y. Issued monthly, October - May.

*Prevention of Blindness News*, National Society for the Prevention of Blindness, 1790 Broadway, New York 19, N.Y.

*The Sight-Saving Review*, Official Quarterly of the National Society for the Prevention of Blindness, 1790 Broadway, New York 19, N.Y.

*Special Education Newsletter*, Bureau of Special Education, California State Department of Education, Sacramento 14, Calif.

## OTHER SOURCES OF HELPS

Organizations offer many kinds of helps, such as publications, speakers, and informed opinions.

American Foundation for the Blind, 15 West 16th Street, New York 11, N.Y.

Bureau of Special Education, California State Department of Education, 721 Capitol Avenue, Sacramento 14, Calif.

Council for Exceptional Children, National Education Association, 1201 Sixteenth Street, N.W., Washington 6, D.C.

Los Angeles County Medical Association, 1925 Wilshire Boulevard, Los Angeles, Calif.

Los Angeles County Superintendent of Schools Office, 808 North Spring Street, Los Angeles 12, Calif.

The National Society for the Prevention of Blindness, 1790 Broadway, New York 19, N.Y.

## PUBLISHING HOUSES AND MANUFACTURERS

American Optical Company, 412 West 6th Street, Los Angeles 14, Calif., for the Snellen Symbol Chart, #1942.

American Printing House for the Blind, 1839 Frankfort Avenue, Louisville 6, Ky., for publications in braille.

Braille Institute of America, Inc., 741 North Vermont Avenue, Los Angeles 27, Calif., an information center.

Stanwix House, Inc., 3020 Chartiers Avenue, Pittsburgh 4, Pa., for large print books and other publications for visually handicapped children.